Transformation: AstroCast
An Instructional Module

Callie McNew
Department of Educational Technology
University of Hawaii at Manoa
Honolulu, Hawaii, U.S.A.
mcnew@hawaii.edu

Abstract: The Gemini Observatory is one of the largest and most requested astronomical research facilities in the world. Employees at the two Gemini telescopes located in Hawaii and Chile agree that sharing research with the public is important for professional astronomical institutions. However, survey results indicated that while many employees participate in public outreach activities and create PowerPoint presentations on their research, their presentations are not accessible online. The *Transformation: AstroCast* instructional module provided information on how Gemini employees can digitize existing PowerPoint presentations using Screencast technology. The module was delivered through a website that incorporated instruction, surveys, and learning assessments. The data collected revealed personal opinions on utilizing screencasts for public outreach and internal trainings, the overall impression and usability of the module, and recommendations for improving the module.

Introduction

In today's society of rich technology, there must be a prevalent web presence for any organization to reach out to the maximum number of interested public. The Gemini Observatory is an astronomy organization whose mission statement is to "Explore the Universe and Share Its Wonders." Employees at the Gemini Observatory agree that sharing information with the public is important for professional astronomical facilities. However, prior to the dissemination of the *Transformation: AstroCast* instructional module, not a single participant had ever created a presentation with audio and visuals that could be accessed online.

The purpose of the instructional design project was to develop and implement a training module for Gemini Observatory staff to learn strategies and technologies that allow for web presentations that can be used for public outreach and internal training sessions.

Participants in the *Transformation: AstroCast* Instructional Module proceeded through a series of steps embedded onto a website that included instructional content on screencasts, pre and post-module surveys, and assessments to evaluate progress.

Background

Traditional ways of communicating science to the public are becoming obsolete in today's world of social media and alternative information sources. To effectively engage the public instructional content needs to be personalized, interactive, and original while incorporating technology (Sandu, 2011).

For this instructional module, an *AstroCast* is the term used to describe a screencast on an astronomy topic. Using screencast technology, users can capture audio and images from a computer to produce an attractive, informative, and powerful message. Data suggests that animated presentations such as screencasts can be more effective learning tools than traditional methods (Brown, 2008). Existing research has uncovered common elements and instructional strategies used to create successful screencasts (Sugar, 2010). There are many screencast software programs to choose from depending on the needs of the user, including Camtasia Studio for Windows and Mac, as well as Jing Free and Jing Pro. (Brown, 2008).

During my employment at the Gemini Observatory, I have witnessed that most astronomers have prepared a PowerPoint presentation on their research, but have failed to make that presentation available beyond their live delivery. Providing the public with internet-accessible information for astronomy outreach is a necessity in today's technology driven society (Sandu, 2011).

Methodology

The *Transformation: AstroCast* instructional design project attempted to motivate participants to create screencast presentations to allow for increased accessibility. The instruction was threefold: defining a screencast, how to create a screencast, and a review of essential elements for a successful presentation.

Instructional strategies

Throughout the module, Gagne's Nine Events of Instruction were addressed to gain attention, inform learner of objectives, stimulate recall of prior learning, present stimulus material, provide learner guidance, elicit performance, provide feedback, assess performance, and enhance retention and transfer (Gagne, Briggs & Wager, 1985). To provide maximum convenience and accommodate the busy lifestyle of participants, the entire instructional module was made available online and designed to take no longer than thirty minutes to complete.

Technologies

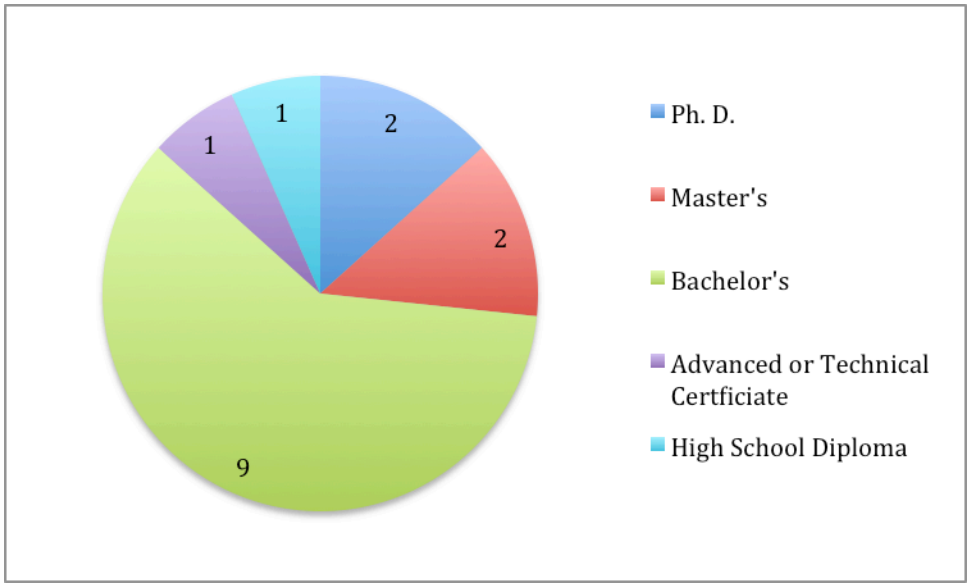
The learning content was created using the screencast software Camtasia Studio for Mac. Camtasia Studio for Mac allowed for the recording of instruction, addition of captions, and performing minimal edits. The instruction was embedded onto a website created on

Weebly.com. Weebly also allowed for the easy addition of surveys, quizzes, and additional resources.

Population

The instructional module was designed specifically for Gemini Observatory employees. Gemini Observatory is one of the leading astronomical observatories in the world. Gemini employees have a range of expertise and educational training (Figure 1) involving astronomy, physics, telescope operations, optics, and software. A request for participation of the module was emailed to forty Gemini employees, and fifteen employees participated. Not all participants answered every test or survey question, which explains the lower number of responses in some tables and charts.

Figure 1. Educational Level of Participants



Data Collection

Quantitative and qualitative data were collected using pre and post-surveys to gather information about the participants, their thoughts on public outreach, their experience with screencasts and PowerPoints, and their overall impression on the usability and effectiveness of the instructional module. Pre, embedded, and post-test data are also compared to assess the progress of the learners and the quality of the instruction.

Results

The following figures and table present the survey and assessment data collected from participants of the *Transformation: AstroCast* module. Data was collected anonymously using the survey tools available in the Weebly design features.

The majority of participants agree that astronomy public outreach is important (Figure 2).

Figure 2. Importance of Public Outreach

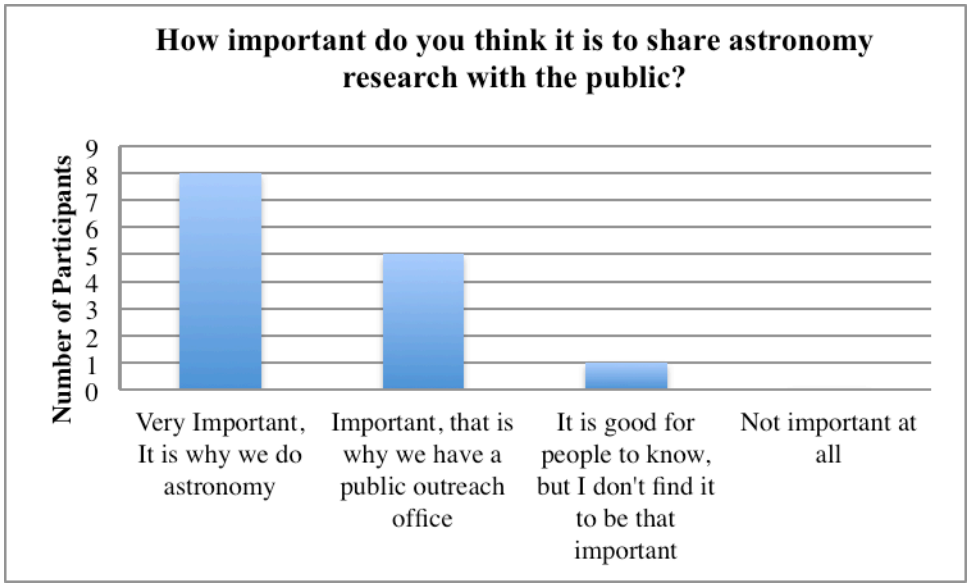
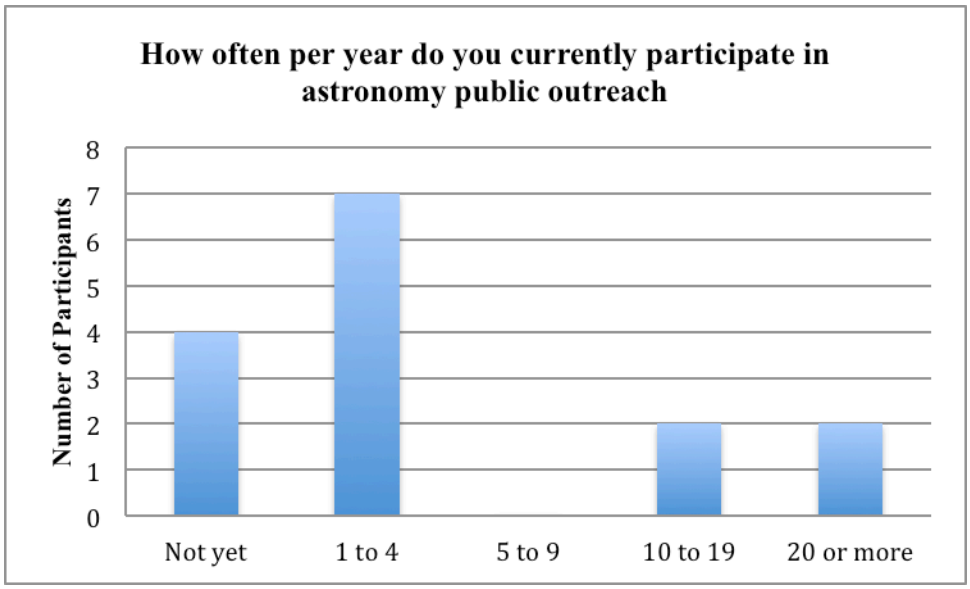
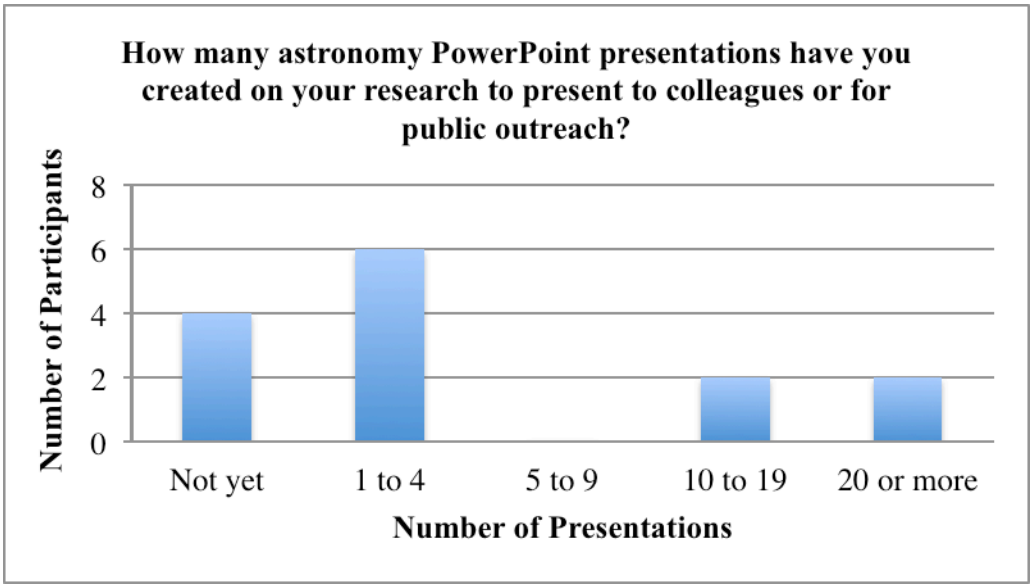


Figure 3. Current Participation in Public Outreach



Most of the employees responded that they currently participate in public outreach activities and have created PowerPoint presentations on their research (Figures 3 and 4).

Figure 4. Number of Prepared Presentations



None of those surveyed have ever created a screencast or posted their live presentations online (Table 1). Most participants think the public would benefit from Gemini employee screencast presentations, and all of the participants think that their coworkers could benefit from internal trainings created using screencast presentations (Table 1).

Table 1. Yes/No Survey Responses

	Yes	No
If you currently participate in classroom visits or live presentations, is there any way to access your presentations online to be viewed at a later time?	**0**	**14**
Prior to this module, have you ever created a screencast presentation?	**0**	**10**
Did this instructional module motivate you to create a screencast presentation for astronomy public outreach?	**7**	**3**
Do you think the public would be interested in accessing astronomy screencast presentations from Gemini employees?	**9**	**1**
Do you think your coworkers could benefit from viewing internal presentations or tutorials created using screencast technology?	**10**	**0**
Would you recommend to your colleagues to view this instructional module and/or create their own astronomy screencast presentation?	**9**	**0**

While not all participants were motivated to create a screencast presentation, all participants would recommend that their coworkers view the instructional module and/or create their own screencast presentation (Table 1).

The open-ended responses in Figures 5 and 6 received from survey questions provide an insight into the participant reactions to the module. The overwhelming response was positive, and the recommendations for improvement were helpful for future modifications.

Figure 5. Open response question:
What is your overall impression of the instructional module?

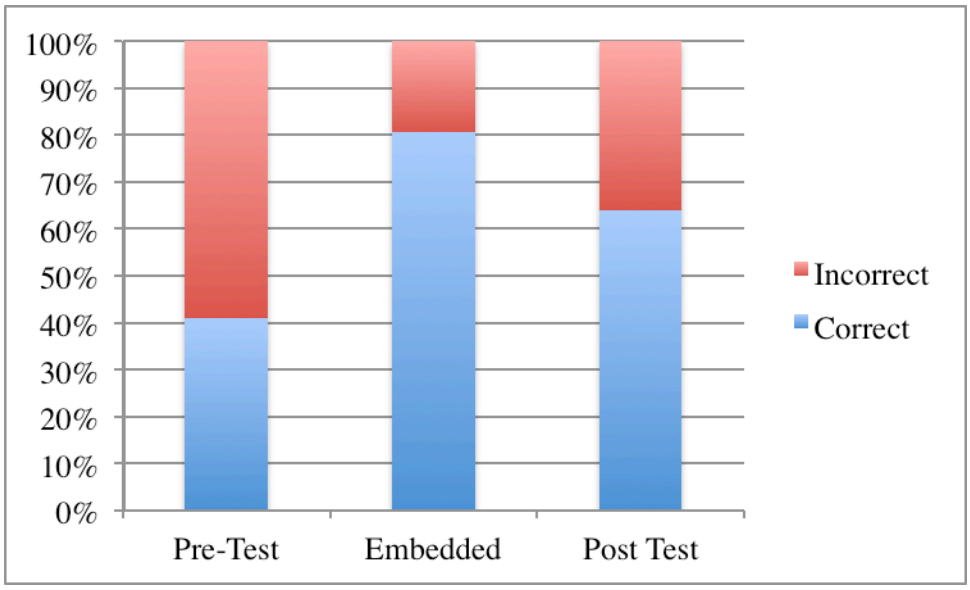
Very good, very basic for someone who knows nothing. A good starting point to learn a new skill.
A plus! These methods promise the possibility of moving past PowerPoint.
It is a very interesting and simple way of learning a new tool. I was a little afraid of all the steps it would take but it went through very fast. Congratulations, not only was it fun but now I am looking forward to try and create one myself!
It was a great presentation and very easy to follow.
I thought it was great. The screencast technology would also be valuable for internal trainings at Gemini. I am going to advocate for its integration.
Put together well. Easy to follow and understand.
I found the content to be good, and easy to follow. After reviewing some of my quiz answers I would have argued that I was correct if it was a graded test.
I enjoyed the presentation, I would like to view it again and try to create my own presentation.
It kept me very interested, and was very informative on a subject I knew nothing about.

Figure 6. Open response question:
Do you have any further recommendations, comments, or suggestions on how to improve this instructional module?

Have another, perhaps optional, module on some basic editing. I like the transitions used in these screencasts, I would like to duplicate some of them.
That was most interesting, and most excellently, masterfully, engagingly delivered. Hats off!
How about having it available with Spanish subtitles?
The only problem that I had was that my computer was slow in loading the video clips and stopped many times during the presentation… but, the content was good and well presented.
The presenter would look much more friendly if they have front lighting.

The percentage of correct and incorrect responses to the test questions can be viewed in Figure 7.

Figure 7. Percentage of Correct and Incorrect Responses to the Pre-Test, Embedded, and Post Test Questions



Discussion

One matter of concern is the percentage of correct and incorrect responses to pre, embedded, and post-test questions (Figure 7). One would hope that the post-test responses would reveal the highest number of correct answers, yet that is not the case. One participant stated, "After reviewing some of my quiz answers I would have argued that I was correct if it was a graded test." Due to the nature of the anonymous design, there is no way to contact the participant to request further explanation. A thorough examination of responses discovered that most participants missed a specific question in the post-test, suggesting that the wording could have been a possible cause of the confusion.

Reflecting on the data and the overall experience of creating the module, there are several changes that would have been advantageous. It is now believed that more interest for creating screencasts would have been generated if the module were designed with the intention of motivating Gemini employees to create internal training screencasts instead of the public outreach focus. As an employee and researcher, I am considering revising the current AstroCast to address this in the future. Creating a system in which participation was confidential instead of anonymous would have allowed for further follow-up on responses.

Conclusion

Gemini Observatory employees are in fact "Exploring the Universe, Sharing Its Wonders" as the mission statement proclaims. However, shared astronomy research with the use of screencast technology is a necessity recognized by professionals in the field and employees at the Gemini Observatory alike.

The *Transformation: AstroCast* instructional module can be used to motivate and inform interested participants who would like to continue the advancement of human knowledge in the field of astronomy. The potential for inspiring people around the world is at our fingertips with screencast technology. As a premiere astronomical observatory it is the responsibility of the Gemini Observatory to lead the forefront in astronomy education and outreach, and it can be done with current technology.

The website address for the *Transformation: AstroCast* instructional module is: http://mcnewastrocasts.weebly.com/

References

Boccato, C., Nobili, L., Pastore, S., & Benacchio, L. (2005). Catch the stars in the net: eight years of experience in communicating astronomy via new technologies. *Proceedings of the ESO/ESA/IAU Conference: communicating astronomy with the public.*

Brown, A., Luterbach, K., & Sugar, W. (2008). *The current state of screencast technology and what is known about its instructional effectiveness.* Department of Mathematics, Science and Instructional Technology Education, East Carolina University, United States.

Christensen, L. L., & Hurt, R. (2008). A hands-on guide to video podcasting. *Communicating Astronomy with the Public Journal, 2,* 5-16.

Gagne, R. M., Briggs, L. J., & Wager, W. F. (1985). *Principles of instructional design.* Wadsworth.

Prodanovic, T. (2009). Ten commandments for presentations. *Communicating Astronomy with the Public Journal, 7,* 19-20.

Rethlefsen, M. L. (2009). Screencast like a pro. *Library Journal, 134*(7), 62-63.

Sandu, O., & Christensen, L. L. (2011). Outrageous outreach – unconventional ways of communicating science. *Communicating Astronomy with the Public Journal, 11,* 22-30.

Sugar, W., Brown, Al, & Luterbach, K. (2010). Examining the anatomy of a screencast: uncovering common elements and instructional strategies. *International Review of Research in Open and Distance Learning, 11*(3).